We Claim:

Standardized Port Biopsy Instrument

1. A biopsy instrument having a proximal end and a distal end, comprising:

a distal assembly for performing a surgical operation;

an elongate flexible member connected to and extending in a proximal direction from the distal assembly, the flexible member including an irrigation conduit and an aspiration conduit; and

a proximal actuation handle coupled to a proximal end of the flexible member, the proximal actuation handle including an irrigation port in fluid connection with a proximal end of the irrigation conduit, the irrigation port for fluid connection to a fluid source, and an aspiration port in fluid connection with to a proximal end of the aspiration conduit, the aspiration port for fluid connection to a suction device.

2. The biopsy instrument of claim 1 further including a control member connected to and extending in a proximal direction from the distal assembly, and the proximal actuation handle further including an actuator coupled to a proximal end of the control member, the actuator for manually actuating the control member and the distal assembly.

3. The biopsy instrument of claim 2 wherein the distal assembly includes a stationary jaw and a movable jaw, the

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movable jaw being pivotable relative to the stationary jaw and in fluid connection with a first of the irrigation conduit and the aspiration conduit, and the stationary jaw being in fluid connection with a second of the irrigation conduit and the aspiration conduit.

4. The biopsy instrument of claim 3 wherein the distal assembly forms a fluid passageway between the irrigation conduit and the aspiration conduit.

5. The biopsy instrument of claim 2 wherein the elongate flexible member includes a control conduit through which the control member extends.

6. The biopsy instrument of claim 1 wherein the irrigation port and the aspiration port include Luer lock attachments.

Fluid Pressuring Increasing Device

7. A biopsy instrument having a proximal end and a distal end, the biopsy instrument comprising:

a proximal actuation handle;

an elongate flexible member connected to and extending from the proximal actuation handle, the flexible member including an irrigation conduit for fluid connection with a fluid source and for supplying a fluid to the distal end of the biopsy instrument;

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a distal assembly for use in a surgical operation, the distal assembly being located on an end portion of the flexible member opposite the proximal actuation handle; and

a fluid pressure device in fluid connection with the irrigation conduit for permitting an operator to selectively increase fluid pressure in the irrigation conduit thereby causing a surge in fluid flow through the biopsy instrument.

8. The biopsy instrument of claim 7 wherein the elongate flexible member includes an aspiration conduit for fluid connection with a vacuum source and for permitting the flow of fluid from the distal end to the proximal end of the biopsy instrument.

9. The biopsy instrument of claim 8 wherein the proximal actuation handle includes an actuator, the elongate flexible member includes a control conduit, and the biopsy instrument includes a control member connected to and extending from the actuator to the distal assembly of the biopsy instrument, the control member extending through the control conduit, wherein actuation of the actuator causes the control member to actuate the distal assembly.

10. The biopsy instrument of claim 9 wherein the distal assembly includes a stationary jaw and a movable jaw, the movable jaw being pivotable relative to the stationary jaw and in fluid connection with a first of the irrigation conduit and

the aspiration conduit, and the stationary jaw in fluid connection with a second of the irrigation conduit and the aspiration conduit.

11. The biopsy instrument of claim 10 wherein the distal assembly in a closed configuration forms a fluid passageway between the irrigation conduit and the aspiration conduit.

12. The biopsy instrument of claim 11 further including a sample collector assembly provided in-line with the aspiration conduit and the vacuum source and located therebetween.

13. The biopsy instrument of claim 7 further including a valve in fluid connection with the irrigation conduit and the fluid source, the valve configured to start and stop a fluid flow in the irrigation conduit.

14. The biopsy instrument of claim 8 further including a valve in fluid connection with the aspiration conduit and the vacuum source, the valve configured to start and stop a vacuum effect in the aspiration conduit.

15. The biopsy instrument of claim 7 wherein the fluid pressure device includes a contractible fluid accumulating chamber.

16. The biopsy instrument of claim 15 further including a first valve in fluid connection with the contractible fluid accumulating chamber and the fluid source and located therebetween, the first valve configured to permit fluid to

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flow into the contractible fluid accumulating chamber from the fluid source and to prohibit fluid from flowing out of the contractible fluid accumulating chamber back into the fluid source, and a second valve in fluid connection with the contractible fluid accumulating chamber and the irrigation conduit and located therebetween, the second valve configured to permit fluid to flow into the irrigation conduit from the contractible fluid accumulating chamber and to prohibit fluid from flowing out of the irrigation chamber back into the contractible fluid accumulating chamber.

17. The biopsy instrument of claim 16 wherein at least one of the first or second valves includes a spring, a spring-biased ball, and a valve seat.

18. The biopsy instrument of claim 15 wherein the contractible fluid accumulating chamber includes a flexible bellows.

19. The biopsy instrument of claim 15 wherein the contractible fluid accumulating chamber includes a piston and a cylinder.

20. The biopsy instrument of claim 15 wherein the contractible fluid accumulating chamber includes a flexible membrane.

21. The biopsy instrument of claim 15 wherein the fluid pressure device is manually actuated.

22. The biopsy instrument of claim 15 wherein the fluid pressure device is foot activated.

23. A method of retrieving a biopsy tissue sample using a biopsy instrument having a proximal and a distal end, the biopsy instrument having a proximal actuation handle, an elongate flexible member extending from the proximal actuation handle and including an irrigation conduit, a distal assembly located at the distal end of the biopsy instrument, and a fluid pressure device in fluid connection with the irrigation conduit, the method comprising the steps of:

inserting the distal end of the biopsy instrument into a patient;

positioning the distal assembly proximate to a tissue to be sampled;

detaching a tissue sample from a surrounding tissue using the distal assembly;

introducing a flow of fluid through the fluid pressure device and the irrigation conduit;

actuating the fluid pressure device to cause a surge in fluid flow through the distal end of the biopsy instrument to flush the tissue sample through an aspiration conduit that permits fluid to flow from the distal end to the proximal end of the biopsy instrument; and

recovering the tissue sample.

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24. The method of claim 23 wherein the aspiration conduit is configured for fluid connection with a vacuum source.

25. The method of claim 23 wherein the step of actuating includes the substep of compressing a contractible fluid accumulating chamber in fluid connection with the irrigation conduit.

26. The method of claim 24 wherein the contractible fluid accumulating chamber includes a flexible bellows.

27. The method of claim 24 wherein the contractible fluid accumulating chamber includes a piston and a cylinder.

28. The method of claim 24 wherein the contractible fluid accumulating chamber includes a flexible membrane.

29. The method of claim 23 wherein the step of detaching includes the substeps of:

opening the distal assembly by manipulating an actuator located at the proximal end of the biopsy instrument and connected to a control member, the control member being connected to a movable jaw of the distal assembly;

positioning the open distal assembly so as to encompass the tissue to be sampled; and

closing the distal assembly by manipulating the actuator, thereby detaching the tissue sample.

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30. The method of claim 23 further comprising the step of initiating a vacuum effect in the aspiration conduit after the detaching step.

31. The method of claim 23 wherein the step of actuating is repeated a plurality of times.

32. The method of claim 23 wherein the positioning, detaching, introducing, actuating, and recovering steps are repeated to retrieve multiple tissue samples without removing the biopsy instrument from the patient.

Sample Collector

33. A sample collector for use with a biopsy instrument having a suction passageway with a proximal end access opening, the sample collector comprising:

a catcher handle having a securing end; and

a catcher body having a screen, the catcher body for insertion into the access opening, being attached to the securing end of the catcher handle, and being positionable within the suction passageway upon insertion into the access opening.

34. The sample collector of claim 33 further including a cover positionable between an open position displaced from the screen and a closed position overlaying the screen.

35. The sample collector of claim 34 wherein the cover is slidably attached to one of the catcher body or catcher handle.

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36. The sample collector of claim 34 wherein the cover is rotatably attached to one of the catcher body or catcher handle.

37. The sample collector of claim 34 wherein the catcher body with the cover in a closed position overlaying the screen fits a pathology processing cartridge.

38. The sample collector of claim 33 wherein the screen includes a plurality of perforations.

39. The sample collector of claim 33 wherein the securing end is for insertion into the access opening and complements the access opening to provide a seal therewith.

40. The sample collector of claim 39 wherein at least one flexible ring encircles the securing end for providing a seal with the access opening.

41. The sample collector of claim 33 wherein a portion of the catcher body complements the access opening to provide a seal therewith.

42. The sample collector of claim 33 wherein the catcher body is removably attached to the catcher handle.

43. The sample collector of claim 34 wherein the catcher handle, the catcher body, the cover and a cover hinge are integrally molded.

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44. The sample collector of claim 43 wherein deformation of the material of the cover hinge permits the cover to rotate from an open position to a closed position.

45. The sample collector of claim 43 wherein at least one flexible ring encircles one of the catcher handle or catcher body for providing a seal with the access opening.

46. A biopsy instrument having a distal end and a proximal end, the biopsy instrument comprising:

a distal assembly for use in a surgical operation;

an elongate flexible member connected to and extending from the distal assembly to the proximal end, the flexible member having an aspiration conduit for fluid connection with a vacuum source and for permitting the passage of matter from the distal end to the proximal end;

a proximal actuation handle with a suction passageway having an access opening, the suction passageway in fluid connection with the aspiration conduit and for fluid connection with a vacuum source; and

a sample collector including a catcher handle with a securing end, and a catcher body with a screen, the catcher body for insertion into the access opening, being attached to the securing end of the catcher handle, and being positionable within the suction passageway upon insertion into the access opening.

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47. The biopsy instrument of claim 46 wherein the elongate flexible member further includes an irrigation conduit extending from the proximal end to the distal end and for fluid connection with a fluid source.

48. The biopsy instrument of claim 46 further including a cover positionable between an open position displaced from the screen and a closed position overlaying the screen.

49. The biopsy instrument of claim 48 wherein the cover is slidably attached to one of the catcher body or catcher handle.

50. The biopsy instrument of claim 48 wherein the cover is rotatably attached to one of the catcher body or catcher handle.

51. The biopsy instrument of claim 48 wherein the catcher body with the cover in a closed position overlaying the screen fits a pathology processing cartridge.

52. The biopsy instrument of claim 46 wherein the screen includes a plurality of perforations.

53. The biopsy instrument of claim 46 wherein the securing end is for insertion into the access opening and complements the access opening to provide a seal therewith.

54. The biopsy instrument of claim 53 wherein at least one flexible ring encircles the securing end for providing a seal with the access opening.

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55. The biopsy instrument of claim 46 wherein a portion of the catcher body complements the access opening to provide a seal therewith.

56. The biopsy instrument of claim 46 wherein the catcher body is removably attached to the catcher handle.

57. The biopsy instrument of claim 48 wherein the catcher handle, the catcher body, the cover and a cover hinge are integrally molded.

58. The biopsy instrument of claim 57 wherein deformation of the material of the cover hinge permits the cover to rotate from an open position to a closed position.

59. The biopsy instrument of claim 57 wherein at least one flexible ring encircles one of the catcher handle or catcher body for providing a seal with the access opening.

Pinch Biopsy Method

60. A method of retrieving a biopsy sample using a biopsy instrument having a distal end, a proximal end, a distal assembly, an elongate flexible member extending from the distal end to the proximal end and including an aspiration conduit, a proximal actuation handle with a suction passageway in fluid connection with the aspiration conduit, the suction passageway having an access opening and for fluid connection with a vacuum source, and a sample collector having a catcher handle and a catcher body with a screen, the method comprising the steps of:

engaging the sample collector into the access opening of the proximal actuation handle;

inserting the distal end of the biopsy instrument into a patient;

positioning the distal assembly proximate the tissue to be sampled;

obtaining a tissue sample using the distal assembly;

initiating a vacuum effect in the suction passageway and the aspiration conduit to draw the tissue sample into the catcher body; and

disengaging the sample collector from the proximal actuation handle.

61. The method of claim 60 wherein the step of obtaining further includes the substep of establishing a temporary vacuum effect in the aspiration conduit to pull the tissue to be severed into the distal assembly.

62. The method of claim 60 further including the step of placing a cover over the screen to entrap a tissue sample.

63. The method of claim 62 further including the step of disconnecting the catcher body from the catcher handle.

64. The method of claim 60 wherein the step of inserting further includes the substep of introducing a remote end of an irrigation endoscope into the patient, and the step of obtaining further includes the substep of providing irrigation fluid from the remote end of the irrigation endoscope to a tissue sample site, wherein the initiated vacuum effect draws

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irrigation fluid and the tissue sample through the aspiration conduit and suction passageway to the screen of the sample collector.

65. The method of claim 60 further including the step of engaging a second sample collector into the access opening of the proximal actuation handle, and the step of repeating the inserting, obtaining, initiating, and disengaging steps for retrieving subsequent tissue samples without removing the biopsy instrument from the patient.

66. The method of claim 60 wherein the step of obtaining further includes the substeps of:

displacing an actuator in a first direction relative to the actuation handle, thereby causing a control member connected to the actuator to move relative to the flexible member, thereby causing a first jaw of the distal assembly connected to the control member to rotate relative to the flexible member and away from a second jaw of the distal assembly;

siting the first and second jaws on opposite sides of the tissue to be sampled; and

displacing the actuator in a second direction relative to the actuation handle, thereby causing the control member connected to the actuator to move relative to the flexible member, thereby causing the first jaw of the distal assembly connected to the control member to rotate relative to the

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flexible member and towards the second jaw of the distal assembly.

67. The method of claim 66 wherein the step of displacing the actuator in a first direction relative to the actuation handle causes the second jaw to rotate relative to the flexible member and away from the first jaw, and the step of displacing the actuator in a second direction relative to the actuation handle causes the second jaw to rotate relative to the flexible member and towards the first jaw.

68. The method of claim 67 wherein the flexible member includes an irrigation conduit in fluid connection with a fluid source and further including the step of providing irrigation fluid from a distal end of the irrigation conduit to a tissue sample site, wherein the initiated vacuum effect draws irrigation fluid and the tissue sample through the aspiration conduit and suction passageway to the screen of the sample collector.

69. The method of claim 68 wherein the step of displacing the actuator in a second direction relative to the actuation handle further includes the substep of forming a substantially fluidtight passageway in the distal assembly.

Pinch Biopsy Instrument

70. A biopsy instrument having a distal end and a proximal end, the biopsy instrument comprising:

a distal assembly for use in a surgical operation, the distal assembly including a movable jaw pivotably coupled to a distal end conduit, the distal assembly forming a fluid passageway in a closed configuration;

an elongate flexible member connected to and extending from the distal assembly toward the proximal end, the flexible member having an aspiration conduit in fluid connection with the distal end conduit for permitting the passage of matter from the distal end toward the proximal end;

a proximal actuation handle including an actuation device, the actuation handle being connected to the proximal end of the flexible member and having a suction passageway in fluid connection with the aspiration conduit, the suction passageway for fluid connection with a vacuum source and having a lateral access opening for receiving a sample collector;

a control member coupled to the actuation device and to the movable jaw of the distal assembly such that actuation of the actuation device pivots the movable jaw relative to the flexible member, thereby opening and closing the distal assembly.

71. The biopsy instrument of claim 70 wherein the distal assembly provides a substantially fluidtight passageway coupled over the distal end of the aspiration conduit when the distal assembly is in a closed configuration.

72. The biopsy instrument of claim 70 wherein the flexible member further includes an irrigation conduit in fluid connection with the distal end conduit and for fluid connection with a fluid source, and wherein the distal assembly provides a substantially fluidtight passageway coupled over the distal end of the aspiration conduit and the distal end of the irrigation conduit when the distal assembly is in a closed configuration.

73. The biopsy instrument of claim 70 wherein the control member includes a pair of pull wires.

74. The biopsy instrument of claim 70 wherein the distal assembly further includes a second movable jaw pivotably coupled to the distal end conduit, and the control member is further coupled to the second movable jaw such that actuation of the actuation device pivots the first and second movable jaws relative to the flexible member, thereby opening and closing the distal assembly.

75. The biopsy instrument of claim 74 wherein the first and second movable jaws are hermaphroditic.

76. The biopsy instrument of claim 75 wherein the first and second movable jaws have sharp cutting edges.

77. The biopsy instrument of claim 75 wherein the first and second movable jaws have teeth for grasping.

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78. The biopsy instrument of claim 75 wherein the first and second movable jaws have mating edges with complementary profiles.

79. The biopsy instrument of claim 70 further including a sample collector positionable within the lateral access opening of the suction passageway.

80. The biopsy instrument of claim 79 wherein the sample collector includes a catcher handle with a securing end, a catcher body with a screen, the catcher body for insertion into the access opening, being attached to the securing end of the catcher handle, and being positionable within the suction passageway upon insertion into the access opening.

81. The biopsy instrument of claim 80 wherein the sample collector further includes a cover positionable between an open position displaced from the screen and a closed position overlaying the screen.

82. The biopsy instrument of claim 70 wherein the actuation device includes an actuator spool formed from two hermaphroditic halves.

83. The biopsy instrument of claim 82 wherein the actuation device further includes a swash plate for coupling the control member to the actuation device.

84. The biopsy instrument of claim 70 wherein the proximal actuation handle further includes a valve for selectively opening and closing the suction passageway, thereby

selectively providing a vacuum effect within the aspiration conduit.

85. The biopsy instrument of claim 83 wherein the proximal actuation handle further includes a spring biased lever for operating the valve.

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